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CURRICULUM TRACKING: CORRELATES AND CONSEQUENCES*

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ABSTRACT

Curriculum Tracking: Correlates and Consequences

by

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Empirical findings concerning the consequences of curriculum tracking are presented. The relationship of curriculum tracking to changes in cognitive performance over a two-year period among 3932 high school students is examined, using multiple regression analysis. The results show that curriculum placement is related to courses taken, and through that, cognitive performance in mathematics and science. It is an effect which is independent of the effects of prior ability, educational expectations, and social class. However, there is no evidence that learning is facilitated by the segregation of students by curriculum placement per se, apart from the impact of differential course-taking. Curriculum tracking also is related to changes in the level of educational and occupational aspirations, satisfaction with school, friendship patterns, and classroom experiences. A view of the school as a social institution which accentuates small initial student achievement differences deriving from social class background through the processes of organizational selection is supported.

CURRICULUM TRACKING: CORRELATES AND CONSEQUENCES

This paper presents empirical findings concerning the correlates and consequences of curriculum placement (tracking) in high schools. Two major questions are addressed by the findings: (1) What kinds of experiences or treatments do students receive as a result of their curriculum placement? and (2) What are the consequences of being placed in a particular track?

THEORETICAL FRAMEWORK

The school is the institutional setting in which children learn or fail to learn. Organizational characteristics of schools define the social context for teaching and learning processes. As McPartland and McDill (1982) argue, small initial student achievement differences, deriving mainly from social class background differences, become accentuated over time through a continuing process of organizational selection. This process funnels students of similar backgrounds into a hierarchy of tracks, programs, and schools, which themselves are associated with different learning environments. The research reported here, because it looks at changes in performance between the sophomore and senior years, cannot capture the entire effect of schooling. Nor is it viewing students before they have been affected by organizational selection. It does attempt, however, to detect the smaller changes that would be expected during a two-year period, in students who have already been differentiated by school structures, in particular by curriculum tracking.

Curriculum placement, one form of school organization, has received considerable attention in the last several years (Alexander, Cook, and McDill, 1978; Hauser, Sewell, and Alwin, 1976; Heyns, 1974; Rosenbaum, 1976; Schaefer and Olexa, 1971; Rehberg and Rosenthal, 1978; Thomas, 1980; Oakes, 1982; Eder, 1981; Hout and Garnier, 1979). The findings of prior

research are particularly contradictory concerning the bases of curriculum assignment and the effects on achievement. On the one hand, track placement appears to have a moderate association with race and class, quality of education received, and educational outcomes for students (Persell, 1977). Differences in track placement have been found to be related to differences in amount and type of teacher-student interactions, educational resources, and grading. These differences in treatment in turn appear to affect students' academic performance, self-esteem, attitudes toward school, and educational attainment. Some studies have even suggested that performance scores tend to rise in high-ability track groups, but to decline in average- or low-ability groups (Borg, 1966; Heathers, 1969; Findley and Bryan, 1971; Persell, 1977). Alexander et al. (1978) found that college track placement increases by about 30 percent the probability that students will plan to continue their education in comparison to equally able and motivated youth in nonacademic programs. They concluded that to a large extent the consequences of placement in a curricular program occur independently of prior academic achievement (also see Alexander and Eckland, 1980).

On the other hand, a few highly influential scholars have recently become convinced that curriculum placement is not an important school variable. Sewell and Hauser (1980), for example, have stated that curriculum tracking may not be a significant mechanism of social stratification. Although Alexander and his associates had earlier found curriculum tracking effects, in 1982 Alexander and Cook examined longitudinal data and concluded that track assignments are based mainly on the criteria of competence and academic orientation, and that tracking and achievement in high school reflects achievement trajectories set in motion years earlier. They further conclude that the effects of curriculum

tracking on senior year outcomes is minimal, e.g., a Beta of .12 in predicting math achievement after controlling for 9th grade social psychological factors, coursework, socialization, and grades.

The study reported here is designed to investigate once again the impact of curriculum track placement on a variety of educational outcomes. It uses the High School and Beyond data, and looks for the relationship of curriculum track placement to changes in the outcome variables between the sophomore and senior year, while controlling for original ability and social class background.

METHODS

The research is a panel design, using a sample of 3932 high school students randomly drawn from a larger sample of 15,941 high school students studied in the High School and Beyond (HS&B) Study and for whom transcripts were collected. The students were surveyed and tested at two points in time (1980 and 1982), during their sophomore and senior years, by the National Opinion Research Center for the National Center for Education Statistics. The basic model employed in this study looks at the changes in student performance and attitudes which occurred during the two-year time period, and measures the relationship of curriculum track location to those changes.

Sample

The original sample of students was selected through a two-stage stratified probability sample with over 1,100 schools selected in the first stage, and 36 students within each school as the second stage units. With the exception of certain special strata, which were oversampled, schools were selected with probability proportional to estimated enrollment in their 10th and 12th grades. The follow-up sample retained the essential

features of a multistage, stratified, and clustered design. The response rate for those students still in school during the follow-up testing was 90 percent.

During the fall of 1982, high school transcripts were sought for a sample of 18,427 members of the 1980 sophomore cohort. Several categories of students were oversampled in the transcript sampling procedures. Weighting procedures were devised to take account of both differential selection probabilities for sample members and differential response rates for different types of schools and students. Eight-nine percent of the transcripts requested from the HS&B schools were received.

From the sample of students for whom transcript data are available, we drew a random sample of 3932 cases. In all analyses reported herein, the weighting factor was applied to approximate the distributions of relationships in the population from which the sample was drawn. For all analyses except the one concerning drop-outs, only students who were still in high school during their senior years were included. While excluding the dropouts might diminish the strength of the investigated relationships, nevertheless the regression equations used for the major analysis must include both sophomore and senior measures in order to examine changes over time.

Analysis Procedures

The basic statistical technique used for the study is multiple regression analysis. To measure changes over the two-year period, the typical regression predicts the senior year variable by the sophomore year variable. Curriculum track location is included to ascertain the relationship of track to the criterion variable, once the sophomore measure has been controlled for. To eliminate the confounding influence of social class background and ability, both of which are related to track location,

background and ability measures are included in the equation. Entered first are the sophomore level of the criterion variable and the background control and ability measures, followed by the two dummy variables for track location.

A word concerning the interpretation of the results is in order. By the sophomore year, it can be presumed that tracking has already been in effect for several years, and thus that whatever impact tracking might have upon performance or attitudes will already have begun. Therefore, the Beta weights and/or added variance explained which are obtained for the regressions covering the two-year period will be attenuated from those which might be obtained were the time span longer. It is reasonable to assume that they will be modest in size. Following conventional procedure, and as suggested by Cohen (1977), we shall consider any Beta weights over .10 to be worthy of notice, although any under .20 should be considered as representing a modest relationship.

Hypotheses

The central questions to be addressed by the research are two: (1) do students in different track locations have different educational experiences as a result of their track placement; and (2) what are the educational and attitudinal consequences of track placement?

To investigate the first question, track placement is hypothesized to have a relationship to the following measures of educational experiences and treatments: number of courses taken in mathematics, science, trade, business, office, home economics, and industrial arts; classroom order; teacher qualities; disciplinary fairness; academic values of peers; counseling services; and to training in leadership skills.

To investigate the second question, track placement is hypothesized to have a relationship to the following dimensions of educational consequence:

academic performance in mathematics, science, and general tests; attitude toward school; schooling persistence; expectations concerning additional schooling; occupational aspirations; self-esteem; feelings of personal efficacy; and involvement in extracurricular activities.

Measures.

Tracking An excellent measure of track location probably has never yet existed. At least four problems in the measurement of track exist. (1) The two-category variable most frequently employed in studies of tracking -- academic track versus all other tracks -- oversimplifies the nature of tracking, which can be as elaborate as a six-level hierarchy. (2) Further, tracking systems vary from one another in diversity and rigidity, as well as degree of hierarchy. (3) Most studies of tracking rely upon student reports of their track location, and yet it is possible that students are not always aware of the track they are in (Rosenbaum, 1980). (4) Finally, schools vary in the degree to which tracking is an integral part of their program.

The measure used in this study suffers from imprecision born of these difficulties. There are no measures of track position of the student in the transcript, so we are left with student reports. Fortunately, students were asked in both their sophomore and their senior years their track location. To determine track, we compared the responses in these two years. If the responses were consistent, we coded track in line with those consistencies. Students who indicated in their senior year that they were in the academic track were coded as being in the academic track, regardless of their sophomore statement. However, if they indicated in their sophomore year that they were in the academic track, and in their senior year that they were in the general, then we inspected the number of foreign

language courses which they had taken (according to their transcripts). Those who had take two or more years of foreign language were then coded as being in the academic track. Ten percent of the students were thus shifted from being classified as general track students according to the senior self-reports to being classified as academic track students. The resulting percentages then are very similar to the percentages given by the principals of the high schools as to the relative distribution of students in the various tracks (see Willms, 1982, for a similar adjustment using educational expectations).

The nominal scale coding used for coding track location for the regression analysis is one created by "effects coding" (Cohen and Cohen, 1983), according to which Track Variable 1 is coded 1 if the student's track placement is academic, 0 if it is general, and -1 if it is vocational; and according to which Track Variable 2 is coded 1 if the student's track placement is general, 0 if it is academic and -1 if it is vocational. Effect coding is particularly appropriate for nominal scales when each group is most conveniently compared with the entire set of groups, rather than with a single reference group, as is facilitated by dummy-variable coding. The effects on the R^2 are the same in either case.

Mathematics performance was measured by two tests, each administered in both the sophomore and senior years. The first test, Math I, consisting of 28 items, measured lower-level mathematics skills, those which ordinarily are learned before the student reaches high school. The second test, Math II, consisting of 10 items, measured a higher level of mathematics skills, those which usually are learned from taking high school courses in mathematics. An analysis of the reliability and validity of the measures used in the HS&B study conducted by Heyns and Hilton (1982) concluded that the reliability of Math I and Math II meet conventional

standards, and that the difficulty levels and timing are appropriate. Further, there is no problem introduced as a result of ceiling effects. Formula-scoring, used in the analysis reported here, tends to increase the variability of scores, and to yield higher correlations between achievement and the independent variables of interest (Heyns and Hilton, 1982).

The items used for the remaining measures are described in Appendix A.

RESULTS

Track Experiences

The first question to be addressed is, what kinds of treatments do students receive as a result of their track placement, and what kinds of experiences do they have?

As shown in Table 1, the results indicate that track location is somewhat related to the course patterns that students follow during their high school experience. A series of multiple regressions found track to be moderately and positively related to the number of courses taken in mathematics and science, and negatively related to business and office courses. The relationships exist even after controlling for measured ability, socioeconomic background, and educational expectations in the sophomore year. Track placement was found not to be related to the number of home economics or industrial arts courses taken. Thus, students in an academic curriculum are more likely than others of equal ability and class origin to take mathematics and science courses. but less likely to take business and office courses.

[Table 1 about here]

Zero-order correlations between track placement variables and other variables related to the issue reveal that track is apparently not related to differences in the following kinds of experiences or treatments:

Table 1. Track Experiences, Parameter Estimates for the Structural Equations, Including Sophomore Measures, Socioeconomic Origins and Curriculum Placement, Reduced and Expanded Models.[1]

	Dependent Variables								
Independent Variables	No. of Math Courses			No. of Science Courses			No. of Bus/Office Courses		
SES	0.101 (0.185)	0.042 (0.078)	0.026 (0.048)	0.118 (0.227)	0.067 (0.130)	0.051 (0.010)	-0.100 (-0.258)	-0.108 (-0.275)	-0.084 (-0.213)
Composite Test Score	0.274 (0.041)	0.159 (0.024)	0.128 (0.019)	0.304 (0.047	0.208 (0.033)	0.176 (0.028)	-0.075 (-0.016)	-0.074 (-0.015)	-0.033 (-0.006)
Soph. Educ. Asp.		0.309 (0.147)	0.261 (0.124)		0.259 (0.130)	0.212 (0.106)		-0.028 (-0.019)	0.045 (0.029
Track Var. One			0.182 (0.274)			0.188 (0.300)			-0.228 (-0.478)
Track Var. Two			-0.024 (-0.051)			-0.040 (-0.087)			-0.033 (-0.095)
Adjusted R2	0.107	0.184	0.207	0.134	0.189	0.211	0.021	0.021	0.077

[1]Standardized and raw (in parentheses) coefficients are presented.
Note: All coefficients are statistically significant, due to large weighted sample size.

(Continued)

Table 1 (continued). Track Experiences, Parameter Estimates for the Structural Equations, Including Sophomore Measures, Socioeconomic Origins and Curriculum Placement, Reduced and Expanded Models.[1]

	Dependent Variables			
Independent Variables	Values of Best Friends, Seniors		Senior Class-Room Behavior	
SES	0.081 (0.073)	0.069 (0.062)		
Composite Test Score	0.109 (0.008)	0.083 (0.006)		
Track Var. One		0.106 (0.136)		0.118 (0.168)
Track Var. Two		0.026 (0.047)		-0.051 (-0.101)
Soph. Values of Best Friends	0.290 (0.166)	0.280 (0.160)		
Sophomore Class-room Behavior			0.413 (0.419)	0.411 (0.416)
Adjusted R^2	0.133	0.141	0.171	0.181

teacher orientation toward students; frequency of talking to counselors or teachers about the curricular program; the fairness and effectiveness of the discipline treatment in the school; and, at the sophomore level only, the tendency of students to talk back to the teacher and to disobey instructions.

Track placement does, however, show a modest correlation to the following differences in experiences or treatments: at the senior level, the tendency of students to talk back to the teacher and to disobey instructions; the academic orientation of best friends; and training in leadership skills.

Two regressions were run at this point to pursue further the relationships found in the prior step, and to control for background ability and class origin. In one, the dependent variable was the academic values of best friends during the senior year, predicted by academic values of best friends during the sophomore year and by track placement, controlling for measured ability and socioeconomic background. The results are presented in Table 1, and reveal that while the strongest predictor of senior peer values is that of sophomore peer values, Track Variable 1 does bear a modest relationship to senior peer values above and beyond that of the other variables. This finding suggests that being in an academic track rather than a general or vocational track provides an environment more favorable to the development of friendship with peers who are academically oriented.

In the second regression, the dependent variable was classroom behavior of the classmates of the respondent during the senior year -- that is, the tendency of students to talk back to the teacher and to disobey instructions. Here we find that track location is modestly related to student classroom behavior in the senior year, even while controlling for

sophomore student classroom behavior.

Track Consequences

While the previous section has suggested that track placement modifies the learning environment, it is the consequences of track placement which have the most interest for researchers and educators. To that we now turn.

Academic performance. As shown in Table 2, it appears that being in an academic track has a modest association with gains in mathematics and science performance between the sophomore and senior years, when controlling for performance at the sophomore year and socioeconomic background. The impact of track on performance is exerted mainly through its influence on the number of mathematics and science courses taken, which we earlier reported to be a moderate association. After controlling for number of courses taken, the coefficients for track drop below even a modest level.

In contrast to the modest relationship of curriculum track location to mathematics and science performance, track location does not appear to be related to gains in the overall test performance scores, (the composite average of the reading, vocabulary, and mathematics standardized scores). This latter finding is consistent with earlier research suggesting that mathematics and science are skills more likely than reading or vocabulary skills to be learned in school rather than in the home, and thus are more sensitive to school practices.

[Table 2 about here]

Educational expectations. As shown in Table 3, track location has a modest relationship to senior educational expectations, while controlling for sophomore educational expectations and social class origin, suggesting in particular that being in an academic track bears a modest influence on

Table 2. Track Consequences: Cognitive Performance; Parameter Estimates for the Structural Equations, Including Sophomore Measures, Socioeconomic Origins and Curriculum Placement, Reduced and Expanded Models[1].

	Dependent Variables							
Independent Variables	Senior Math Performance			Senior Science Performance			Senior Composite Test Performance	
SES	0.092 (1.410)	0.075 (1.150)	0.065 (0.997)	0.112 (0.704)	0.091 (0.575)	0.082 (0.517)	0.068 (0.853)	0.056 (0.709)
Track Var. One		0.108 (1.336)	0.073 (0.912)		0.113 (0.575)	0.087 (0.446)		0.079 (0.809)
Track Var. Two		-0.018 (-0.307)	-0.016 (-0.297)		-0.028 (-0.204)	-0.025 (-0.181)		-0.006 (-0.090)
Soph. Math Perf.	0.803 (0.884)	0.775 (0.854)	0.742 (0.817)					
No. Math Courses			0.146 (1.221)					
Soph. Sci. Perf.				0.691 (0.691)	0.674 (0.673)	0.655 (0.654		
No. Sci. Courses						0.092 (0.299)		
Soph. Test Perf.							0.840 (0.853)	0.818 (0.834)
Adjusted R^2	0.705	0.713	0.731	0.538	0.547	0.553	0.755	0.760

[1]Standardized and raw (in parentheses) coefficients are presented.
Note: All coefficients are statistically significant, due to large weighted sample size.

elevating the college plans of students, while not being in such a track has a slightly depressing influence.

[Table 3 about here]

Occupational aspirations. Table 3 reveals further that track location has a modest relationship to occupational aspirations, even when controlling for ability level, social class origin, and occupational aspirations two years earlier. Aspirations to the higher prestige occupations are increased to a greater extent among academic track students between the sophomore and senior year, then, than among similar students in the nonacademic tracks.

Liking for school. Two indicators of liking for school are the composite measure of student attitude and the measure of dropping out. Table 3 reveals that track location has a modest relationship to seniors' attitude toward school, while controlling for ability, class origin, and attitude toward school during the sophomore year. Academic track students are more likely than nonacademic track students of similar ability and socioeconomic origin to increase their appreciation for school over the two-year time-span.

However, there is no corresponding relationship to drop-out rate. While the zero-order correlation between Track Variable 2 (which measures general track location in comparison to location in the academic and vocational tracks) and drop-out rate is modest ($r = .15$), when ability and social class origin are controlled for in a multiple regression, the coefficients for track location drop to near zero.

Psychological state. As shown in Table 3, track placement is related to the senior scale measuring locus of control, while controlling for the sophomore measure and for socioeconomic background. Thus, seniors in the academic track are somewhat more likely than similar seniors in the

Table 3. Track Consequences: Attitudes and Activities; Parameter Estimates for the Structural Equations, Including Sophomore Measures, Socioeconomic Origins and Curriculum Placement, Reduced and Expanded Models.[1]

Independent Variables	Dependent Variables											
	Senior Educational Aspirations		Senior Occupational Aspirations		Senior Liking of School		Senior Locus of Control		Senior Extracurr. Activity		Senior Leadership Skill	
SES	0.130 (0.503)	0.113 (0.438)	0.111 (0.730)	0.089 (0.580)	-0.004 (-0.004)	0.011 (0.011)	0.093 (0.087)	0.072 (0.067)	0.177 (0.428)	0.133 (0.322)	0.113 (0.632)	0.071 (0.397)
Track Var. One		0.154 (0.485)		0.123 (0.648)		-0.139 (-0.112)		0.127 (0.096)		0.156 (0.345)	0.176 (0.790)	[illegible]90 (0.402)
Track Var. Two		-0.035 (-0.155)		0.079 (0.589)		0.070 (0.079)		-0.050 (-0.052)		-0.007 (-0.022)	-0.098 (-0.624)	-0.083 (-0.527)
Soph. Educ. Aspirations	0.590 (0.582)	0.541 (0.535)										
Composite Test Score, Soph.			0.086 (0.045)	0.043 (0.023)	-0.098 (-0.007)	-0.068 (-0.005)						
Sophomore Occup. Aspirations			0.205 (0.206)	0.186 (0.187)								
Sophomore, Like School					0.311 (0.324)	0.305 (0.317)						
Sophomore, Locus of Control							0.406 (0.435)	0.391 (0.419)				
Sophomore, Extra-curricular Act.									0.162 (0.212)	0.161 (0.211)	0.205 (0.356)	0.176 (0.306)
Senior, Extra-curricular Act.												0.337 (0.012)
Adjusted R^2	0.420	0.436	0.080	0.108	0.119	0.131	0.189	0.199	0.061	0.082	0.084	0.187

[1]Standardized and raw (in parentheses) coefficients are presented.

Note: All coefficients are statistically significant, due to large weighted sample size.

other two tracks to have increased their feelings that they have control over their own lives.

On the other hand, track placement apparently has no relationship to the senior measures of self-esteem, while controlling for sophomore self-esteem and socioeconomic background. The zero-order correlations of Track Variables 1 and 2 with self-esteem are less than -.08, and in the multiple regression, the Betas are less than -.06.

Extracurricular activities. As shown in Table 3, track location is modestly related to senior extracurricular activity, while controlling for sophomore levels of extracurricular activity and social class background. Thus, students in the academic track are more likely than similar students in the other two tracks to become involved in extracurricular activities.

Extracurricular activities and leadership skills training. Recall that it was reported above that those in the academic track are more likely to receive training in leadership skills such as leading a group, explaining a position, and speaking before an audience. We suspected that the real influence in this case might be the effect of extracurricular activity upon leadership skills training. A multiple regression of senior leadership skill training upon sophomore levels of such training and upon participation in extracurricular activities bears out that suspicion. Table 3 presents the results, indicating that senior extracurricular activity is moderately related to leadership skills training. When senior extracurricular activity is included in the analysis, the Beta for Track Variable 1 drops to .09, which is below our previously-chosen standard of .10 for considering a Beta to be worthy of notice. Thus, while track placement may encourage students to become more involved in extracurricular activities, it does not apparently provide the occasion for training in

leadership skills; rather the extracurricular activities themselves are most significant in this regard.

DISCUSSION

Curriculum tracking is a significant aspect of school organization. It channels the experiences of students, it alters the classroom, and affects programs. A strong motivation on the part of school officials for maintaining a curriculum tracking system is to make the task of teaching and maintaining order easier and more manageable. Many believe that teaching and learning are facilitated if students of similar ability are grouped together so that teachers can focus on their needs in particular. Yet, while students end up in their tracks partly on the basis of their ability, ability is not the only basis of track placement. As revealed in a companion study to this research (Jones, Vanfossen, and Spade, 1985), the track placements of students also are affected by a number of other individual and school-level variables such as their socioeconomic background, their preferences, the number of seats available in track-related courses, and where teachers, counselors, and school administrators think they should go. About a third of high-ability students do not pursue an academic curriculum, for example.

This paper has looked at the relationship of curriculum track location of individual high school students to changes in their behavior, performance, and expectations during a two-year period, a period which for many of them is the culmination of an overall five to six (or more) year period of curriculum tracking.

Does it matter? Once students are committed to their curricular programs, do they take different courses, associate with different kinds of classmates, and face different treatments by their teachers? Our model, focusing on changes in a two-year period, led us to look for modest

evidence pertinent to that question, and this we have found for a number of the outcome variables measured. In the study reported here, we have found small but important consequences of curriculum track placement over a two-year period for aspirations, satisfaction with school, friendships, extracurricular activities and leadership training, classroom experiences, and courses taken.

Most substantial are the relationships found between track location and course enrollments. Curriculum track placement channels students into certain course patterns, which in turn affect the growth in learning between the sophomore and senior years. While early ability is the most powerful predictor of senior performance, courses taken has an effect upon cognitive growth which is independent of prior ability. For that reason alone, the effect of curriculum tracking upon course-taking is an important finding. Those interested in policy implications might consider at least one conclusion: One way to raise the level of performance in mathematics and science would be to influence students to take more courses in mathematics and science, perhaps through school-imposed curricular requirements.

A second important finding of this study which may have policy implications is that apart from the effects on course-patterns, tracking does not affect cognitive growth. We have found no evidence to suggest that learning is facilitated if students of similar ability and interest are segregated from other students and then given special treatment appropriate to their ability levels and interests. What does seem to be the case, rather, is that such segregation encourages those in the academic track more than those in other tracks to increase their educational and occupational aspirations, it affects their associations with friends so

that they are increasingly surrounded by academically-oriented peers, it encourages them to become more involved in leadership-training extracurricular activities, and to be more optimistic about their own powers of self-control. These findings support the idea that the organization of students through a tracking system provides greater opportunities for students from the middle to upper ranges of the social class spectrum (because class is related to track placement, see Jones et al., 1985) and for some students of higher ability (because track placement is somewhat related to ability), not because it helps students learn, but because of its effect upon required courses, aspirations, friendships, and sense of mastery.

Such consequences are good for students in the academic track. The other side of the coin, however, is that tracking is not so good for the students in other tracks. Thus, students not in the academic track are not given the environment which encourages them to increase their educational and occupational aspirations. Rather, they are segregated in the classroom with peers who themselves have lower aspirations and who become increasingly disruptive of classroom proceedings. They are not encouraged through their track placement to become involved in extracurricular activities, and they are not given the experiences which lead to a higher sense of mastery. The benefits which accrue to academic-track students by virtue of their track placement would be beneficial to students in other tracks, particularly those of high ability, but even those of lower ability levels. (This is shown by other findings, not presented here, that even for the middle- and lower-ability students, the greater the number of courses taken in mathematics and science, the greater is the cognitive growth in those areas; see Spade, Vanfossen, and Jones, 1985.)

The only exception to the generalization of low cognitive effects has

been uncovered in a companion study to this one (Spade et al., 1985), which compared the relationships of track location to performance in schools for high-ability students to low-ability students. For low-ability students (those in the bottom quartile on a sophomore measure of ability), placement in an academic track was found to be related to cognitive growth in mathematics and science, even after controlling for race, sex, socioeconomic background, and expecially if they were attending a school with a predominantly high-ability student body. Otherwise, as the research reported in this paper shows, the influence of track placement comes to roost not on cognitive growth, which conforms more to the modal levels of growth in the school, but rather on courses taken, aspirations, friendships, classroom behavior, and extracurricular activities, all of which may themselves affect cognitive performance.

Finally, a third implication of the study's findings is that how schools are organized does affect student behavior and cognitive change. While it might seem obvious to some that curriculum placement affects students' curriculum, and that courses taken affect what is learned, the doubt about the efficacy of school treatments which has pervaded the literature over the prior decade has generally tended to overlook this form of school organization and its impact upon student learning. Following the 1966 Coleman et al. report that individual background factors seemed to have more impact upon learning than did characteristics of schools, a number of others reported that between-school differences in resources have little relationship to educational achievement (Jencks et al., 1972; Husen, 1972; Wiley and Harnischfeger, 1974; Averch et al., 1972; Walberg and Rasher, 1979). Consequently, many began to doubt the ability of schools to do much more than exist as holding and maintenance stations for

adolescents. These findings suggest otherwise. Schools design course prerequisites and curriculum patterns; schools also decide what criteria will be used for the placement of students into tracks, and how important ability will be in that placement versus student inclination. The school's structuring of course patterns through curriculum track placement does have some effect upon cognitive growth, above and beyond that of student background and motivational characteristics.

While the relationships we have found are small, as is to be expected when measuring change over a two-year period, nevertheless they exist for a number of different dimensions. We have become more convinced of the utility of a view of school as a social institution which accentuates small initial student achievement differences deriving from social class background through the processes of organizational selection and treatment. The findings of this study are necessarily tentative, given the less-than-perfect measure of curriculum placement, and the short time-period over which the effects of tracking have been examined. Nevertheless, they are sufficient to keep open the question of the impact of curriculum tracking, and they suggest the fruitfulness of continuing study of the social organization of schools.

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APPENDIX A

MEASURES

Family socioeconomic background: A composite score, based on family income, father's education, mother's education, father's occupation, and 8 household items. Scores included for every student who gave information on at least two of the items. From the 1980 Sophomore questionnaire.

Number of courses taken in mathematics, science, trade, business, office, home economics, and industrial arts: Number of courses taken in each of these areas computed from the transcript records of each student. High scores indicate high numbers of courses taken.

Student perception of disciplinary climate: From Senior questionnaire, a composite score based on the sum of scores for three questions: Please rate your school on the following items: discipline effectiveness; discipline strictness; and discipline fairness. High scores indicate positive ratings.

Exposure to disorderly students in the classroom: From Sophomore and Senior questionnaires, a composite score based on the sum of scores for two questions: To what extent are the following disciplinary matters problems in your school? Students talk back to teachers; and students don't obey instructions. High scores indicate low exposure.

Student perception of teacher treatment is based on six senior items: In your opinion, how many of the teachers in your school have these characteristics: work you hard; treat everyone with respect; are witty and humorous; don't talk over your head; and are patient and understanding.

Academic orientation of peers is based on the responses to four items: "Please think of your closest friend in this school who is a sophomore [senior]. As far as you know, are the following statements true or false for him/her? Gets good grades. Is interested in school. Attends class regularly. Plans to go to college." High scores indicate the statements are false.

Exposure to guidance from school personnel is measured by responses to two questions: "How much have you talked to the guidance counselor about planning your high school program?" and "How much have you talked to your teachers about planning your high school program?" High scores indicate a great deal.

Training in leadership skills is indicated by a composite score which is the sum of the responses to the following items: "This year, how often have you: spoken before an audience of 50 or more; helped plan for a large social event; explained or defended a position on an issue of some importance before a group; worked with a group of classmates on a project with little adult supervision; headed group problem-solving discussions; chaired a meeting?" High scores indicate often.

Mathematics performance is discussed in text of paper.

Liking for school is measured by responses to two items: "Are the following statements about your experience in school true or false? I am satisfied with the way my education is going. I am interested in school." High scores indicate student is not satisfied and interested.

Dropping out is determined by whether or not the student continued schooling until graduation from high school.

Educational expectations is a composite variable created by adding together the scores for two variables: "How far in school do you think you will get?" and is it true or false that "I will be disappointed if I don't graduate from college?" High scores indicate high educational expectations.

Occupational aspirations is measured by a question asking students what type of occupation they expect to have at age 30. Typical categories, of which there are 17, are responses indicating clerical occupations, sales, proprietor, and manager. The order of the categories was altered so that the categories are ranked on a dimension of occupational prestige.

Self-esteem is measured by responses to four items taken from the Rosenberg scale, for which reliability coefficients between .85 and .92 have been obtained (Rosenberg, 1965): "How do you feel about each of the following statements? I take a positive attitude toward myself. I feel I am a person of worth; on an equal plane with others. I am able to do things as well as most other people. On the whole, I am satisfied with myself.

Locus of control is measured by responses to four items: "How do you feel about each of the following statements: Good luck is more important than hard work for success. Every time I try to get ahead, somethingbody stops me. Planning only makes a person unhappy, since plans hardly ever work out anyway. People who accept their condition in life are happier than those who try to change things.

Involvement in extracurricular activities is measured by summing the number of activities the student indicated s/he has participated in. Included are: debating or drama, band or orchestra, chorus or dance, hobby clubs, vocational education clubs, newspaper or yearbook staff, and subject matter clubs.